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ABSTRACT

The writing across the curriculum program at Michigan Technological University was designed to change teacher and student attitudes about course-assigned writing as well as to change writing practices by means of a series of faculty workshops. After four years, a team of seven faculty members from rhetoric and composition, literature, psychology, and linguistics--with the help of faculty from several other fields--designed a research and evaluation program to determine the success of the writing across the curriculum project. The evaluation proved that many students and instructors came to view writing as a complex and central activity, integral to learning and understanding in all disciplines. A total of 20 individual studies was conducted for the evaluation, including the following: (1) two studies of student laboratory reports, in biology and engineering, which showed the success of the faculty workshops; (2) a writing assessment of engineering students, which showed that the evaluation design had not been integrated to program goals as well as it might have been, and that the program itself was not quite as effective with engineering students as the faculty had hoped; and (3) two studies of student journals in mathematics and civil engineering, which showed that speculative writing plays an important role in student learning in content area courses. Among other things learned by this evaluation was the value of the multiple measures approach. (HTH)

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RESEARCH CONNECTIONS: WRITING IN THE DISCIPLINES

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Recently, while I was speaking to an interdisciplinary group of faculty on writing across the curriculum, a history teacher asked me: "How can we get students to take ungraded writing seriously?" While I paused to consider a crafty response, not one, I am sure, that would be worthy of the rhetorical and political implications of the question, a science teacher asked: "How can we get students to take graded writing seriously?" After a moment of what I took to be serious laughter, an English teacher asked: "How can we get teachers to take any kind of student writing seriously?" Obviously, our conversation was becoming serious indeed.

Actually, these questions are versions of ones we asked ourselves in 1977 when Michigan Tech began its writing-across-the-curriculum program. We came to believe that our program had to change the attitudes of both faculty and students about course-assigned writing before we could expect long term change in behaviors. Thus we set up a program designed to change attitudes about writing as well as change writing practices. The program was teacher-centered in that its primary goal was to enable teachers, primarily through

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participation in a series of faculty workshops, to integrate writing and reading into the daily activity of their normally scheduled content courses.

After a few years, we knew that a lot of good things were happening on our campus in the name of writing across the curriculum, but we weren't prepared to articulate the goings-on to our campus community and to the larger academic community. Thus, in the fall of 1981 we decided to add a major research and evaluation component to the faculty development and curricular aspects of our program. We wanted to know if writing was being taken seriously on our campus.

To undertake the task of studying our program, we assembled a team comprised of two faculty trained in rhetoric and composition, two trained in literature, two trained in experimental and cognitive psychology, and one in applied linguistics. These seven met weekly and designed the research and evaluation program, implemented it, and monitored it. They were assisted directly by about a dozen other faculty in such fields as civil and electrical engineering, biology, mathematics, and English.

As the research plan began to take shape we eventually developed four goals:

1) to describe what was happening at Michigan Tech as a result of the writing-across-the-curriculum program;

2) to evaluate the strengths and weaknesses of the program;

3) to examine in practice the theoretical assumptions which informed our program; and

4) to use whatever we learned from the study to change and strengthen our on-going program.

On the advice of Lee Odell, we began our research and evaluation project committed to a "multiple offense" approach. We wanted to look at a variety of the elements that made up our program and we wanted to do the looking from a variety of perspectives using numerous methodologies and critical frameworks. In the process we looked at both teachers' and students' attitudes toward writing, at course assignments, at writing processes, and at written products. We used many different strategies to do our looking, involving both qualitative and quantitative assessments in naturalistic and experimental environments.

This paper, then, is about what research has taught us, the program administrators, about changing the role of writing on our campus. If many viewed writing as a simple and adjunct activity to the real business of an economics or engineering course, we hoped that they would come to view writing as a complex and central activity, integral to learning and understanding in all disciplines. We now have evidence which suggests that we succeeded fairly well.

On the other hand, in 1977, we held a naive view of research which saw it as a simple and adjunct component to the real business of our program--curricular and faculty

development. What we discovered is that research is complex and integral to our writing-across-the-curriculum program.

I would like to discuss briefly five of the twenty or so individual studies which contributed to our overall research project. From each study we gained information which often was corroborated or contradicted by other studies. However, when all studies were taken together a more complete picture of our program emerged than could have been possible otherwise. I will not recount in detail the methodology and the results of these research projects (which will be available elsewhere--in Writing Across the Disciplines: Research into Practice, eds. Art Young and Toby Fulwiler, Boynton/Cook, 1986), but rather hope to provide the detail necessary to demonstrate the value we discovered in the multiple measures approach.

Two Studies of Student Laboratory Reports. We suspected that one of the most frequent writing tasks students at Michigan Tech were assigned was the familiar laboratory report. We instituted two studies, one is biology and one in engineering, to examine such lab reports.

The first study was initiated by two biology professors. After attending a writing-across-the-curriculum workshop, they decided to change their pedagogy in assigning laboratory reports in a sophomore level sequence for biology majors--embryology, anatomy, and physiology. Where once they simply required lab reports but did little in preparing students to write them, they now asked students for written

critiques of professional articles, arranged small group discussions of the professional articles as models for student lab reports, and requested that the student lab reports be submitted in draft for peer critique and subsequent revision. After a year of such changes, these teachers were convinced that their students were writing better lab reports and doing better biology as well.

The following year, they collaborated with two English teachers to look more systematically at this pedagogy. Four sections of this biology sequence were instructed as follows: in one section students did peer critiques of each other's lab reports, in one section they did analysis of professional models, in one section they did both peer critiques and analysis of models, and one section served as a reference--students were given written guidelines for writing laboratory reports but received little other guidance.

Biology graduate students were trained to holistically score the lab reports from the four sections. All three treatment sections wrote better reports than the reference section. Such might be a classic example of the Hawthorne effect, or more likely, it might represent an example of what can happen in a class where the writing of laboratory reports is a considered and serious activity.

In a second study, we examined all the writing of five engineering students over their four years at MTU. We discovered that over half (53%) of all the writing opportunities

Michigan Tech engineering students had in four years of education were engineering laboratory reports. If we remove the writing done in Freshman English, 74% or 23 of the 30 writing tasks assigned to these students were engineering laboratory reports. We also discovered through questionaires and interviews that the students did not value the writing of these reports.

When we examined the reports themselves, we noticed that they all followed a standard format designed to demonstrate the writer's understanding of the laboratory experience. However, we believed that in practice these reports were isolated from any meaningful social, rhetorical, or problem-solving context. Although the reports did reflect the rote experience of the lab, they did not discuss or even imply the implications of the lab in the development or application of knowledge, or consider such questions as why? so what? for whom? or what next? When we considered the goal with which we began--to change student and teacher attitudes about the importance of writing-- we had to admit little evidence of such change was reflected in these lab reports.

Although the writing these students did in humanities and science courses showed the influence of our writing-across-the-curriculum program, we realized that most of the writing these five students did in college was not influenced by our writing-across-the-curriculum effort. These engineering lab reports exhibited features of graded writing

which is abstracted from meaningful context, examples of what happens when teachers and students do not take writing seriously, but do it anyway. Students wrote one way in humanities classes and another way in engineering classes. Indeed, most of these students did not view their lab reports as "writing," at least in the context of reviewing their college writing experiences. We realized that we needed to know more about such laboratory reports: their potential as learning experiences as well as testing instruments, their rhetorical and disciplinary context, and their existing role in our comprehensive writing program.

When we compare the results of the two studies, we have indications of the success of our faculty workshops--since the biology but not the engineering teachers had participated in them. We also realized that we had not been successful in involving enginnering faculty in the program to the degree we wanted, and thus we began our efforts to do so. The reading of these two sets of laboratory reports raised issues about the rhetorical context of such academic writing and the pedagogical purposes which use and , maybe, abuse it. Such issues arose in a particular educational context--the MTU campus; but they engage us in a more general concern about what constitutes the development and expression of knowledge in specific disciplinary contexts.

The Writing Assessment. In 1977 when we submitted our grant proposal for a writing-across-the-curriculum program, we

included an assessment of student writing abilities as the principal method of evaluation to determine if the grant monies had been used to good effect. We agreed to "administer" (I love that word in this context; it conjures up images of doctors administering treatments and drugs to cure, or at least sedate, long suffering patients) to administer a fifty-minute writing sample at two-year intervals to selected members of the freshman and senior classes. We hoped to be able to tell if seniors were writing better than freshmen and if seniors in 1981 and 1983 who had the benefits of our program wrote better than seniors in 1979 who did not.

In 1981, four years later, the research team wondered what the authors of the grant had in mind when they designed this study--never mind that in some cases they were the same people. Our writing-across-the-curriculum program espoused certain fundamental pedagogical strategies which we worked very hard to integrate into the use of writing in all disciplines. Such things as the importance of self-selecting topics, of revision, of expressive writing and writing to learn, of critical reading, of awareness of audience, of collaborative efforts and peer feedback, etc. We knew from a large-scale survey that numerous teachers across campus were indeed incorporating these strategies into their course work, but that the one group which had been reticent and not very active in participating in the program was the College of Engineering faculty, and now we were going to measure the effectiveness of these strategies by

herding 200 College of Engineering seniors into a room every two years and asking them to write for fifty minutes on a topic which was selected for them, had nothing to do with any specific course content or audience need, and with no oppportunity for pre-writing, research and critical reading, rewriting, or feedback. Only four years later did it dawn on us that this design was counterproductive to our goal of having writing taken seriously on campus.

We even began to realize that if the scores of the writing samples did begin to rise every two years, that there would be little cause and effect between such rises and what our program was about. This realization, which occurred early in our planning, increased our commitment to the multiple measures approach--we needed other ways, besides this simplistic and perhaps errant one, to get at what we wanted to know.

Yet we decided to proceed with the assessment. Differences of opinion on the value of the assessment within the committee combined with curiosity and obligatory guilt to make the project seem worthwhile. Engineering faculty were trained to score analytically the College of Engineering writing samples using the Diederich scale. According to the measurement, seniors wrote better than freshmen. But there was no statistically significant difference in scores of seniors in 1979, 1981, and 1983.

We became concerned that our "instrument" wasn't sensitive enough to record subtle differences in student writing

ability. (Where do all these medical metaphors come from?) So essays from all three senior classes were rescored according to a primary-trait scoring guide. These scores indicated that the 1981 senior class wrote slightly better than either the 1979 or 1983 senior classes.

In hindsight, we realize that we may have been wrong to predict that our program would make students write better fifty-minute impromptu essays in the setting of a clinical laboratory--in which they were subjects in a communication experiment rather than communicators. However, we recognize that there may be some correlation between overall writing proficiency and the ability to write well on demand in unusual circumstances. The results of this study hinted at two things, among others: that we had not been careful, in this case, of integrating evaluation design to program goals, and that our program may not be as effective as we wanted it to be with students enrolled in the College of Engineering.

Two Studies of Student Journals. We realized that much writing on our campus was assigned as if students were consumers rather than producers of knowledge. When our program began, writing was infrequently assigned outside of writing courses, and when it was, it seemed to be connected to testing purposes, as in the engineering laboratory reports. We were particularly interested in whether writing as a learning activity could be successfully introduced and practiced on our campus, and if so, whether such writing was effective in

promoting learning within the classroom community. We assumed that regular written engagement with course content would increase understanding and thereby contribute to both development of knowledge and writing abilities.

We set up studies to look at ungraded, speculative writing, generally composed in journals or log books, in mathematics and civil engineering classes, among others.

In the mathematics study, we set up three experimental sections in order to get a glimpse at the use of journals in a traditionally taught mathematics class. One section did only speculative journal entries for home work, one section combined journal entries with numerical homework problems, and one section, the control, did only numerical problems for homework. All sections took the same examinations. There was no difference on how the different sections of students performed on these examinations. In this limited study, journals proved to be equally as effective as homework problems in preparing students to demonstrate their knowledge of course content on a traditional numerical exam.

The study in civil engineering was descriptive. In a structures class, taught by a faculty member who had attended a writing-across-the-curriculum workshop but who had never assigned speculative writing before, students were required to keep journals in which they wrote frequently on class activities. This study focused on journal writing and its role in student learning, its role in preparation of final reports, and its role in

student-teacher interaction in creating a classroom community supportive of writing and learning.

Results indicated that students who kept journals experienced opportunities to use writing for speculation and problem-solving on course content and for direct communication with the teacher. Their final reports on designed projects were judged more coherent, organized, and complete than the reports written by students in a control section which did not keep journals. One unanticipated result was the positive affect that the informal student writing had on the teacher. It provided him with a perspective on student learning, on his pedagogy, and on course goals which challenged and reinvigorated his thinking on these issues.

These two studies suggested that speculative writing has an important role to play in student learning in courses across the curriculum. Our investigations into student journals took us in some unexpected directions: we raised the issue of quality in speculative writing--what do we mean when we say some student journals are better than others? We considered the nature of directed journal entries--in which ways teacher direction and response could encourage facility in the use of writing as a tool for learning. We started out viewing expressive writing-to-learn tasks as primarily private individualized acts, but we soon saw the social and communicative contexts of this kind of writing. We saw clearly that some students and teachers had taken ungraded writing

seriously.

We asked basic questions: what is expressive writing and what is it for? We asked practical questions such as whether journals would be successful in all classes--our program's recommendation--regardless of class size, content, or the teacher's instructional paradigm. Under what conditions will the use of journals and other forms of ungraded speculative writing in content courses be successful? We now believe that journals, if not closely and continually integrated into course goals--that is, if they are simply assigned as an add-on course requirement in much the same way that many term papers and lab reports have traditionally been assigned--will not be effective. To attempt to add-on writing to any content course is simply to fall victim to the established curricular paradigm that form and content are separate entities. This being the case, they might just as well be divided into separate courses in separate departments--writing over here, content over there.

I have spent some little time discussing one model for establishing a research component to an on-going writing-across-the-curriculum program. I hoped to show how examining our program's assumptions led to research questions that after investigation returned to provide direction for the pedagogical, curricular, and administrative aspects of the program. I think this is a useful model, one based on a critical and methodological pluralism, for fostering research in writing

across the curriculum.

In developing this research model we discovered several things:

--the value of the multiple measures approach;

--the importance of a research component as a follow-up activity for faculty in all disciplines;

--an increased understanding of the nature of our program and of student writing in a disciplinary context;

--a knowledge of our program's strengths and weaknesses and direction for further program development;

--a renewed commitment to the concept of writing across the curriculum.

Although not all research findings will have or should have direct application to pedagogy or program philosophy, we need a more informed base from which to foster continuing and new developments in the writing-across-the-curriculum movement. Otherwise we might do as one school has done and define writing intensive courses as those courses in which students must write a minimum of twenty-five pages typed and double-spaced, a serious situation indeed. Perhaps one in which students who do not want to write, produce for teachers who do not want to read, and sometimes don't. Before long writers and readers may begin to plot about putting writing back in the English department, where, some may argue, it should remain.